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METHOD FOR FORMING COATING FILM  
OF CARBON OR MATERIAL COMPOSED  
MAINLY OF CARBON

### Abstract:

**PURPOSE:** To obtain a coating film of carbon or a material composed mainly of carbon and having high hardness by decomposing a hydrocarbon gas with a plasma generated between electrodes and adding hydrogen or oxygen to the decomposition product to form a carbon film.

**CONSTITUTION:** A DC or high-frequency electric energy is applied between the 1st electrode and the 2nd electrode placed close to a substrate having a surface to be treated. A hydrocarbon gas or a mixture of the hydrocarbon and an additive gas is decomposed by the plasma generated by the above electric energy to form a carbon film on the surface of the substrate. In the above process, hydrogen or oxygen is added to the system in the formation of the carbon film. The hydrocarbon gas may be hydrocarbons such as methane, ethylene or alkane hydrocarbon, a silicon carbide such as tetramethylsilane in the case containing silicon as a part of the component, or a chlorinated carbon such as carbon tetrachloride. The bias is increased by the addition of hydrogen or oxygen to form a coating film having high Vickers hardness.

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